Mining Evidence in the Online Academic Journal Databases:
Access and Performance in Public Sector

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Abstract

Access to the online academic journal databases is essential for evidence-informed decision making in developing Ministry of Health and Long-Term Care (MOHLTC) strategy and policy documents. In operation since 2008, the Journal Access Centre (JAC) is an online access tool supported by journal content selection and acquisition services. JAC provides access to articles published by more than 17,000 healthcare, medical, economics, business, social science and policy journals. The case study will show JAC within the MOHLTC information management framework. Content optimization, usage statistics and performance assessment issues will be described.

Contents

- Learning objectives
- Why Read Journals?
- Evidence-Informed Decision Making Framework
- Journal Access Centre
- Journal Databases Structure
- Evaluating Performance and Value
- Usage Statistics
- Customer Satisfaction
- Financial Assessment
- Environmental Scan – Canada, OPS
- Conclusions

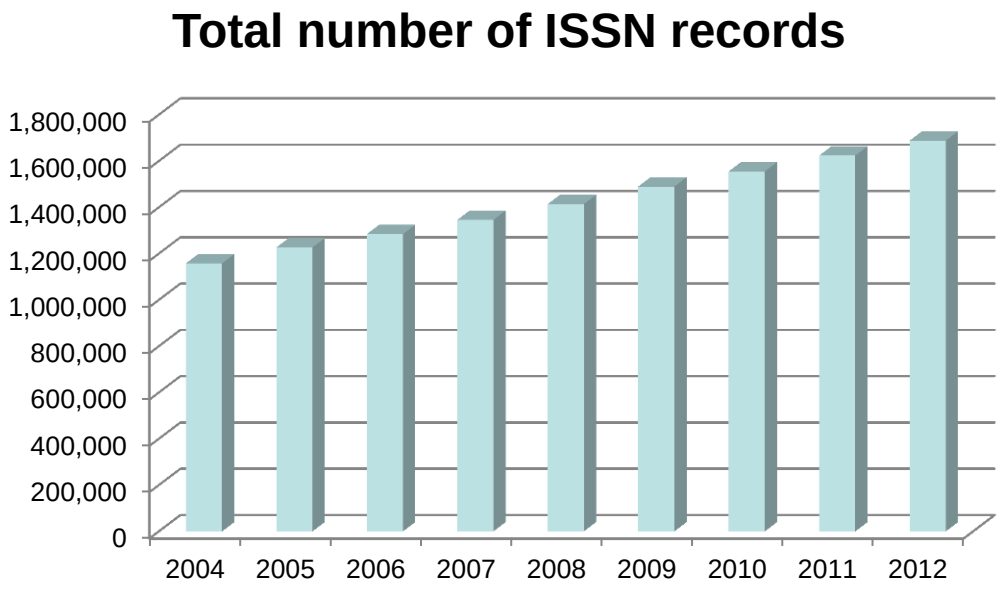
Learning Objectives

- Be able to formulate benefits of accessing online journal databases.
- Understand financial challenges of accessing journal databases.
- Be able to apply indicators characterizing performance of the online application.

Number of Serials

- Total number of serials registered by ISSN by the end of 2012 is 1,688,275.
- Each year 60,000 to 70,000 new journals are started.
- Numbers include both academic journals and trade magazines, active and non-active.
- All subject disciplines.

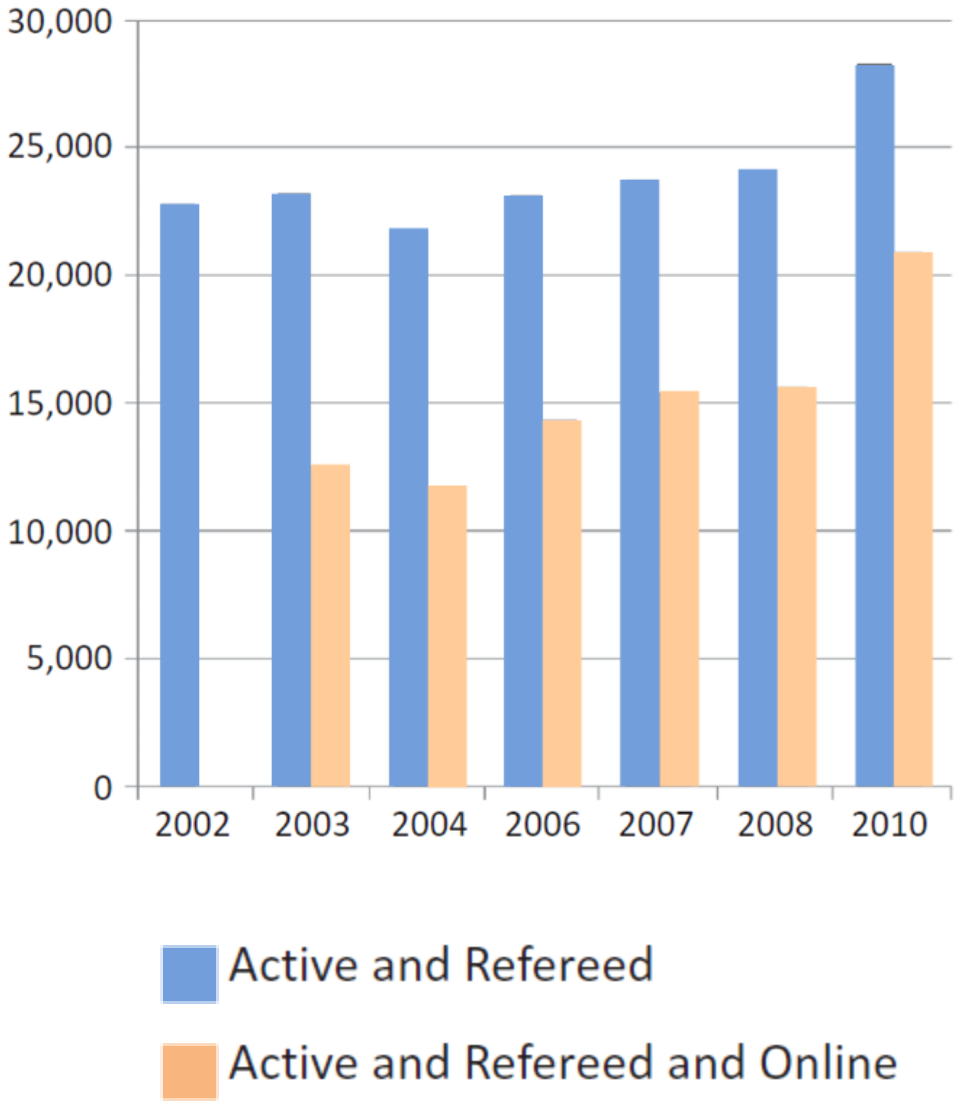
Data Source: ISSN International Center website. [1]



Academic Journals

- *Another source - UlrichsWeb Global Serials Directory*
- 28,325 active and refereed journals in 2010
- All subject disciplines
- Number of articles published in peer-reviewed journals is estimated at 1.2M – 1.35M per year
- An average university faculty in US spends 130-140 hours reading 240 scholarly articles per year
- 85-95 per cent: proportion of journals available electronically, 2009 [7]
- 10 per cent: proportion of Open Access journals, 2009 [7]
- $5 billion: estimated global turnover of academic publishing, 2009 [7]

Source of data and chart: Carol Tenopir, Regina Mays & Lei Wu (2011) [3]



Why Read Journals

- Outcomes of readings

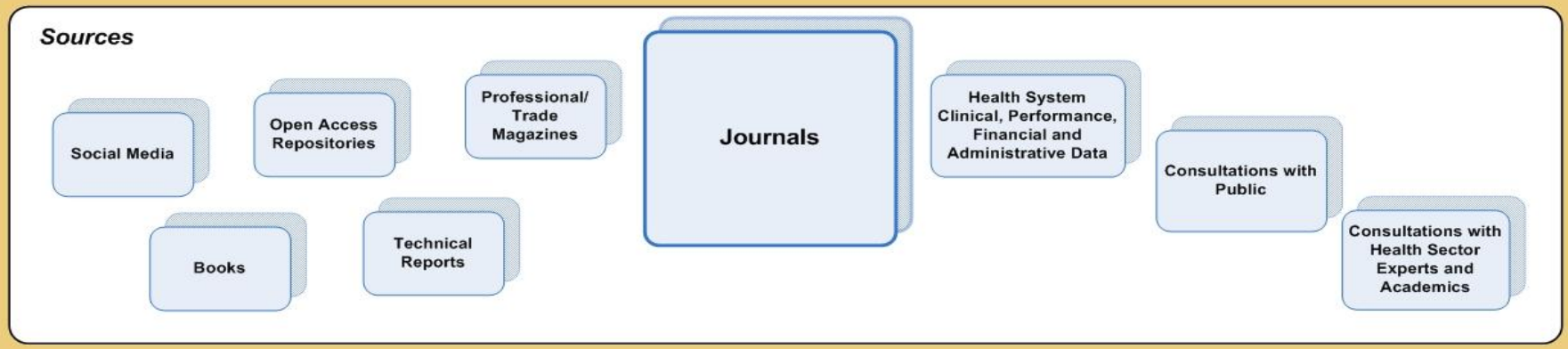
  Results of the UK survey of the six universities, over 2,000 faculty members participated. Outcomes of the last article reading.

  1. Inspire new thinking or ideas (54%)
  2. Improve results (38%)
  3. Narrow, broaden, or change the focus (28%)
  4. Resolve technical problems (10%)
  5. Save time or other resources (10%)
  6. Aid in faster completion of purpose (5%)
  7. Assist or result in collaboration or joint research (4%)

Source: Carol Tenopir et all, (2011) [5]

Journals in the Evidence-Informed Decision Making Framework

Access to journals is a key pre-requisite for evidence-informed decision making



Influencing Factors

Complex forces compete with research evidence:
- Interests of stakeholders
- Prevailing societal values
- Ideologies of governing parties
- Constraints of prior policies

Enabling Factors

- Skills
- Tools
- Guidance
- Organizational culture
- Stimulus to apply
- Documented mandatory requirements

Types of research use in EVI-DM:
1. Instrumental. The evidence is acted on in a specific and direct way.
2. Symbolic. Research is used to justify a position already taken.

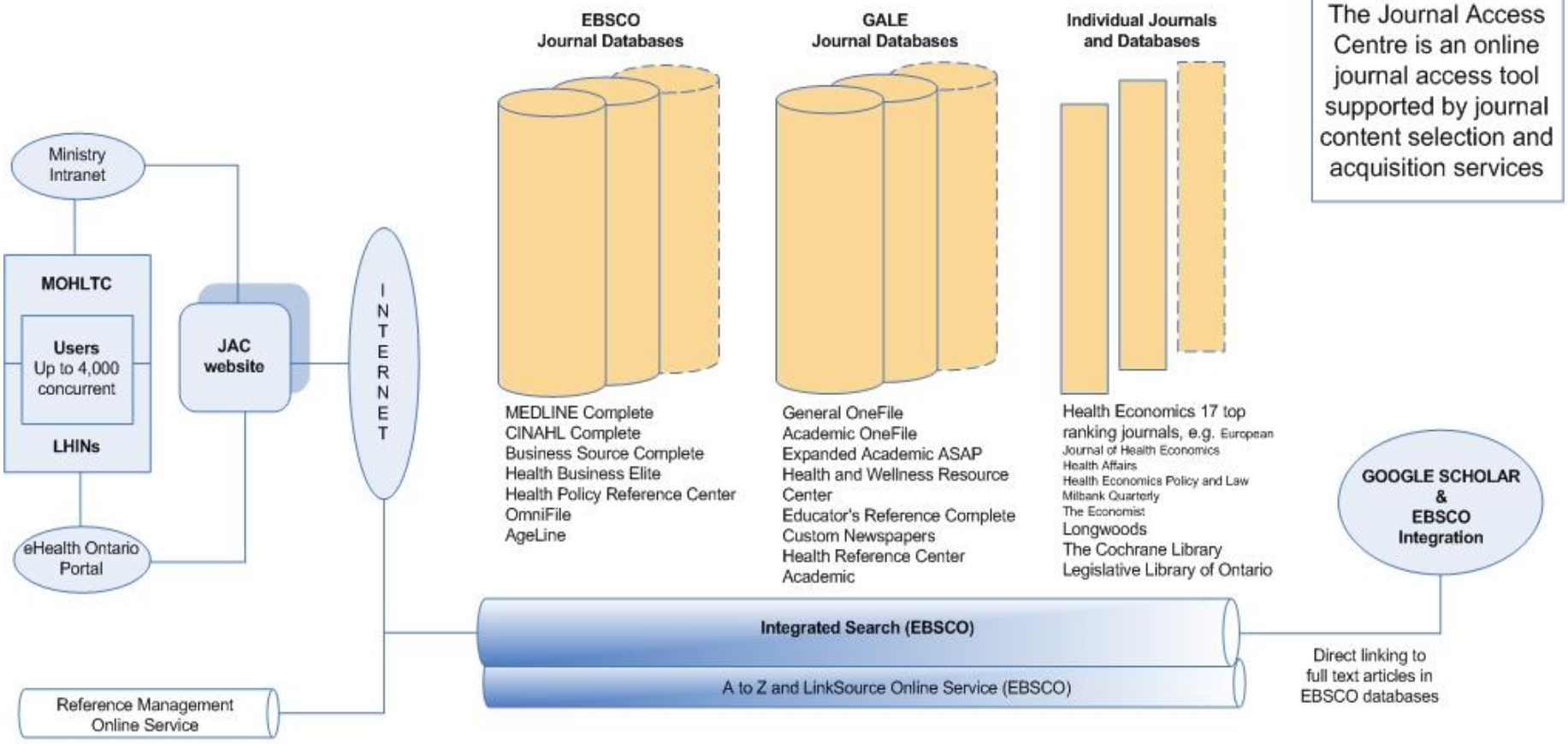
3. Principal use of research in EVI-DM is conceptual:
- A source of enlightment.
- A way of thinking about the issue (not an instrumental tool definning the "right" solution to the problem).
- A catalyst for debade.
- Allowing interpretation within the context of local implementation factors.

Continued discussion on:
What constitutes evidence?
How evidence is used?

Sources: Lomas, J., & Brown, A. D. (2009).
Field, P., et al, (2012).

Journal Access Centre (JAC)

The Journal Access Centre is an online journal access tool supported by journal content selection and acquisition services



JAC Features

Content

- Access to over 17,000 journal titles.
- Journals cover: health, social science, business, policy, economics, finance, management, risk management, etc.
- Over 9.0M articles (including prior years archive).
- Federated search permits searching 17 databases at once.
- Automatic e-mail notifications of new content – may be very specific to meet individual information needs.
- Content does not include any sensitive information (e.g. personal health) – only openly published materials.
- Information flows only from vendors to the JAC users (downloading). No ministry information revealed to external organizations.

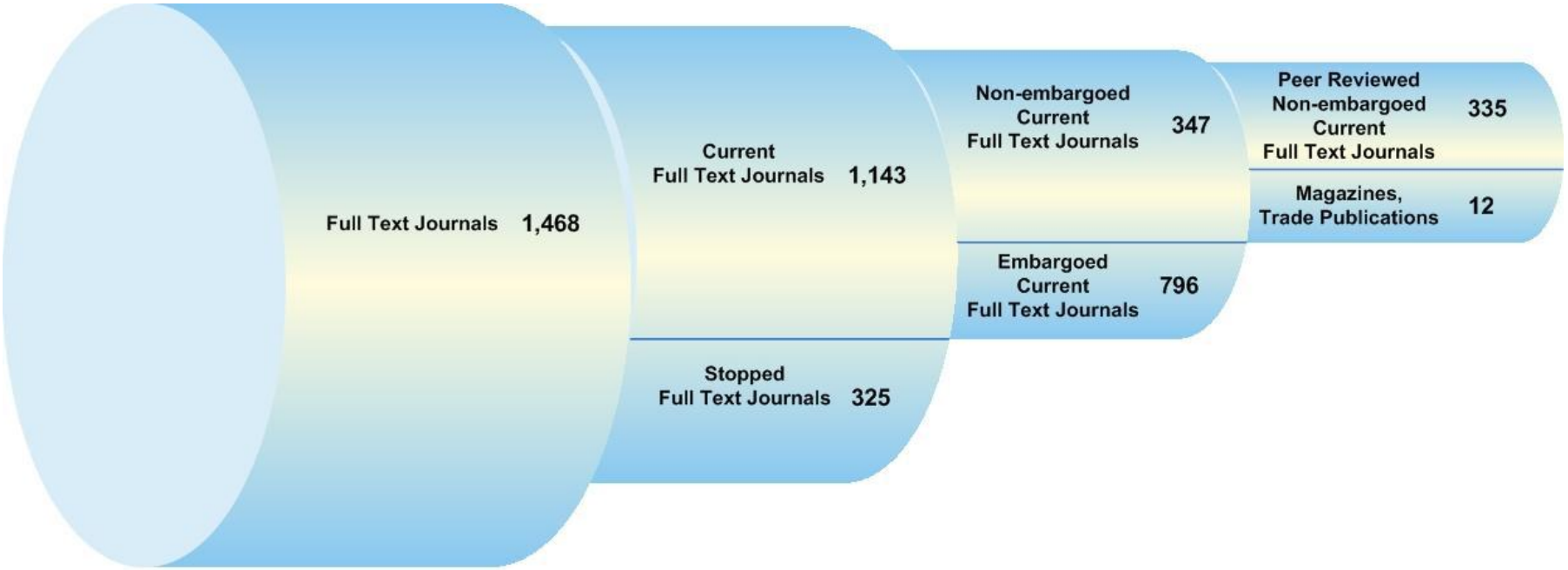
Technology

- Accessible 24 x 7.
- Cloud-based application - no Health Services Cluster resources required.
- Web-based application – only web browser required for access.

JAC Benefits

- Directly contributes to the Ontario's Action Plan For Health Care (2012) by providing **access to evidence** that helps answer the question of how finite health care dollars should be allocated to best serve patients.
- Reduction in journal subscription costs.
- Research tool at users' desktop.
- Greening impact.
- Easy to use.
  - No log-on. Google-type search.
- Increased productivity and time savings as a result of federated search.
- Highly reliable service (one 3-hour incident of service disruption in more than 4 years).
- Potential simultaneous access for all Ministry and LHINs users (up to 4,000 employees).

MEDLINE with Full Text Database Content

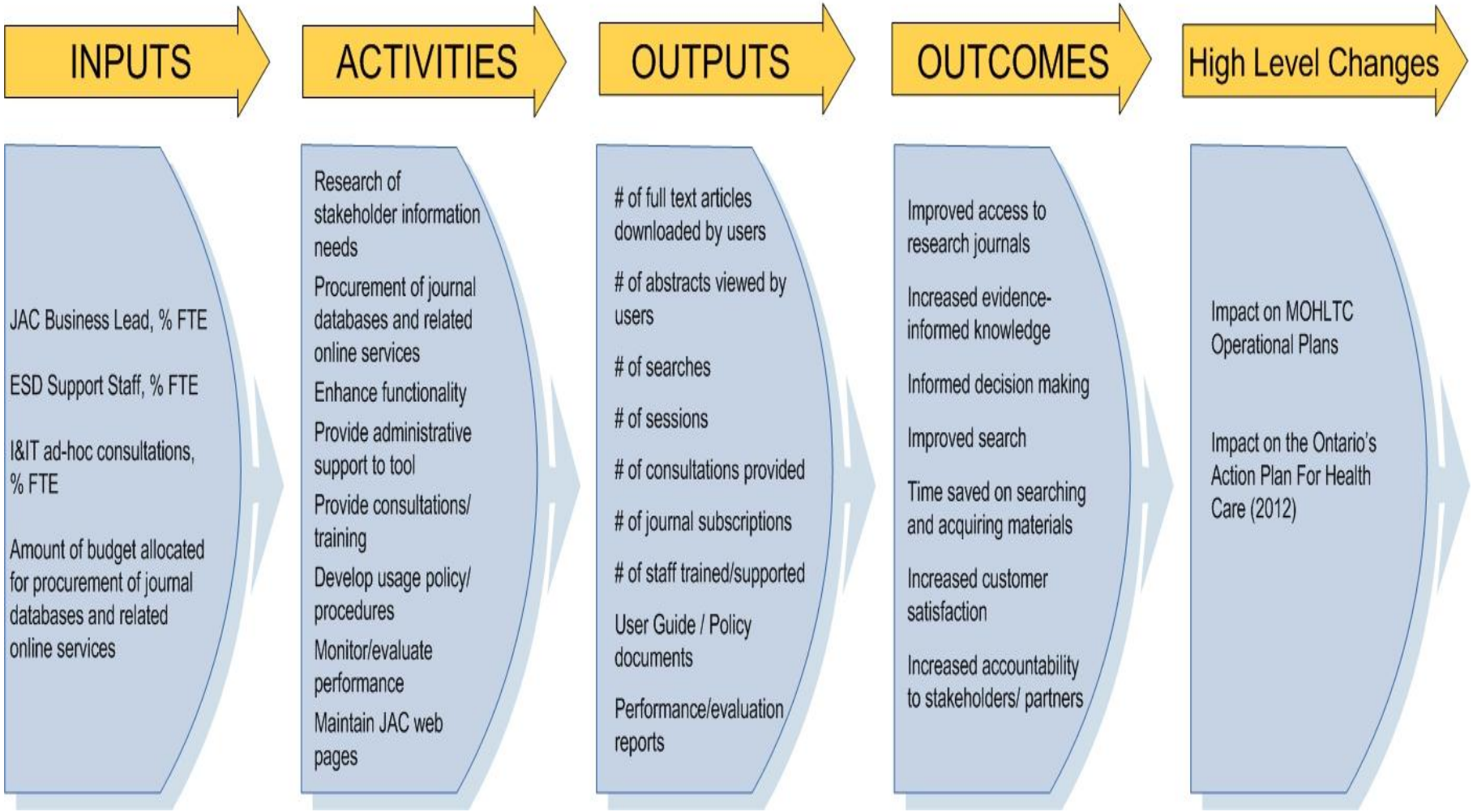


The structure of a sample database: i.e. number of full-text journals, non-full-text journals (abstracts or indexing), etc. The most valuable segment of the database are the full-text, current, non-embargoed journals – total of 347 titles. Around eight hundred (796 titles) journals have embargoes. Most embargoes (750 titles) are from 12 to 18 months long.

EBSCO Databases Content

Database	Total Number of Journals in the Database	Abstracts Only	Full Text	Stopped Full Text	Current Full Text	Embargoed Current Full Text	Non-embargoed Current Full Text		
								Peer Reviewed	Magazines, Trade Publications
MEDLINE Complete	2,184	0	2,184	357	1,827	1,183	**644**	608	36
CINAHL Complete	5,453	3,825	1,628	537	1,091	277	**814**	587	227
Business Source Complete	5,023	1,191	3,832	1,139	2,693	638	**2,055**	943	1,112
Health Business Elite	714	64	650	414	236	67	**169**	140	29
Health Policy Reference Center	472	37	435	149	286	81	**205**	143	62
OmniFile Full Text	3,125	0	3,125	982	2,143	274	**1,869**	1,184	685
AgeLine	209	209	0	0	0	0	**0**	0	0
TOTAL	**17,180**	**5,326**	**11,854**	**3,578**	**8,276**	**2,520**	**5,756**	**3,605**	**2,151**

JAC – Logic Model



Performance and Value

Ways of measuring performance and value:

- Collecting and analyzing usage statistics
- Conducting customer satisfaction surveys
- Assessing financial efficiency

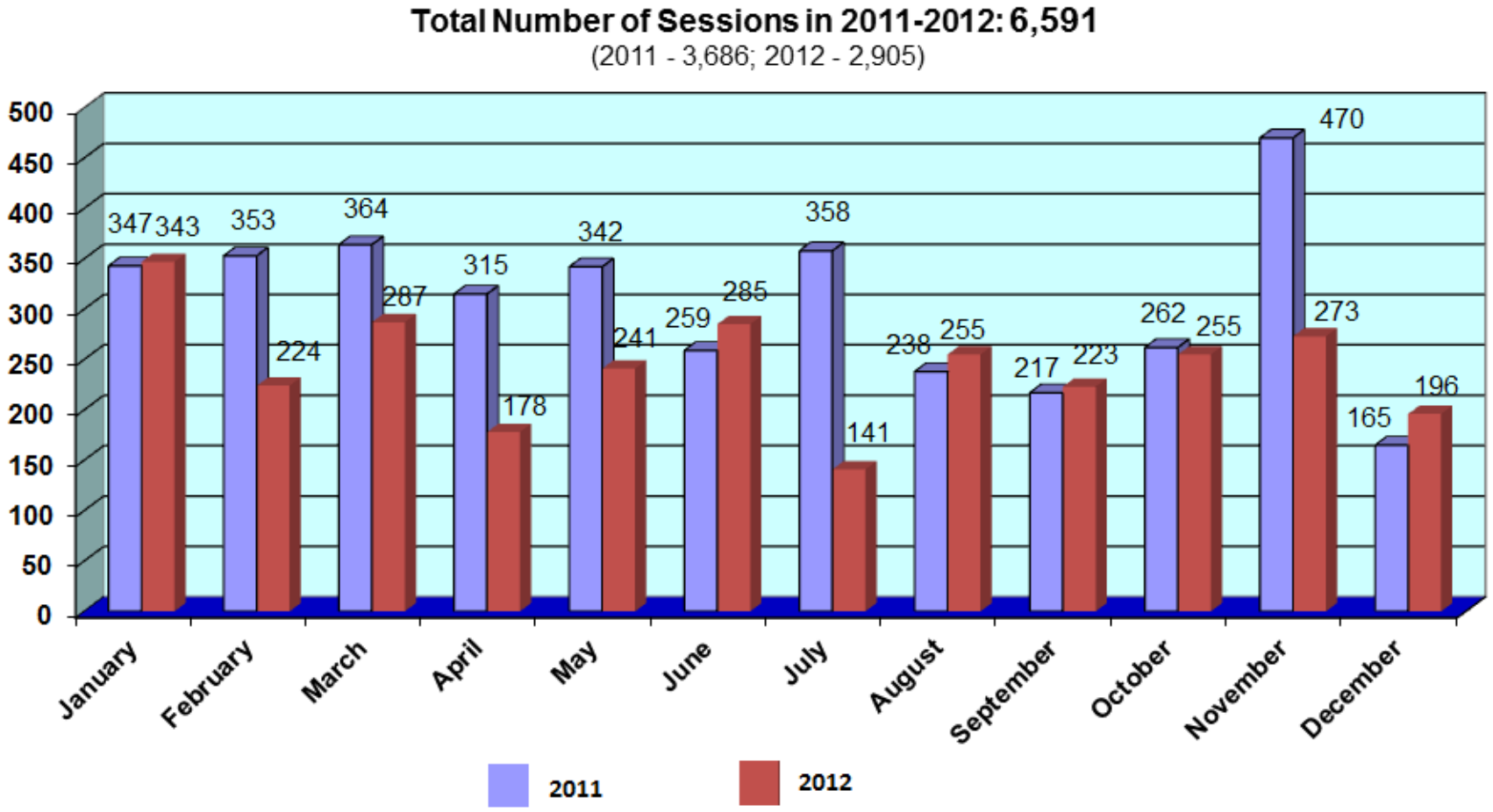
Database Usage Indicators

Journal database usage is characterized by the following indicators:

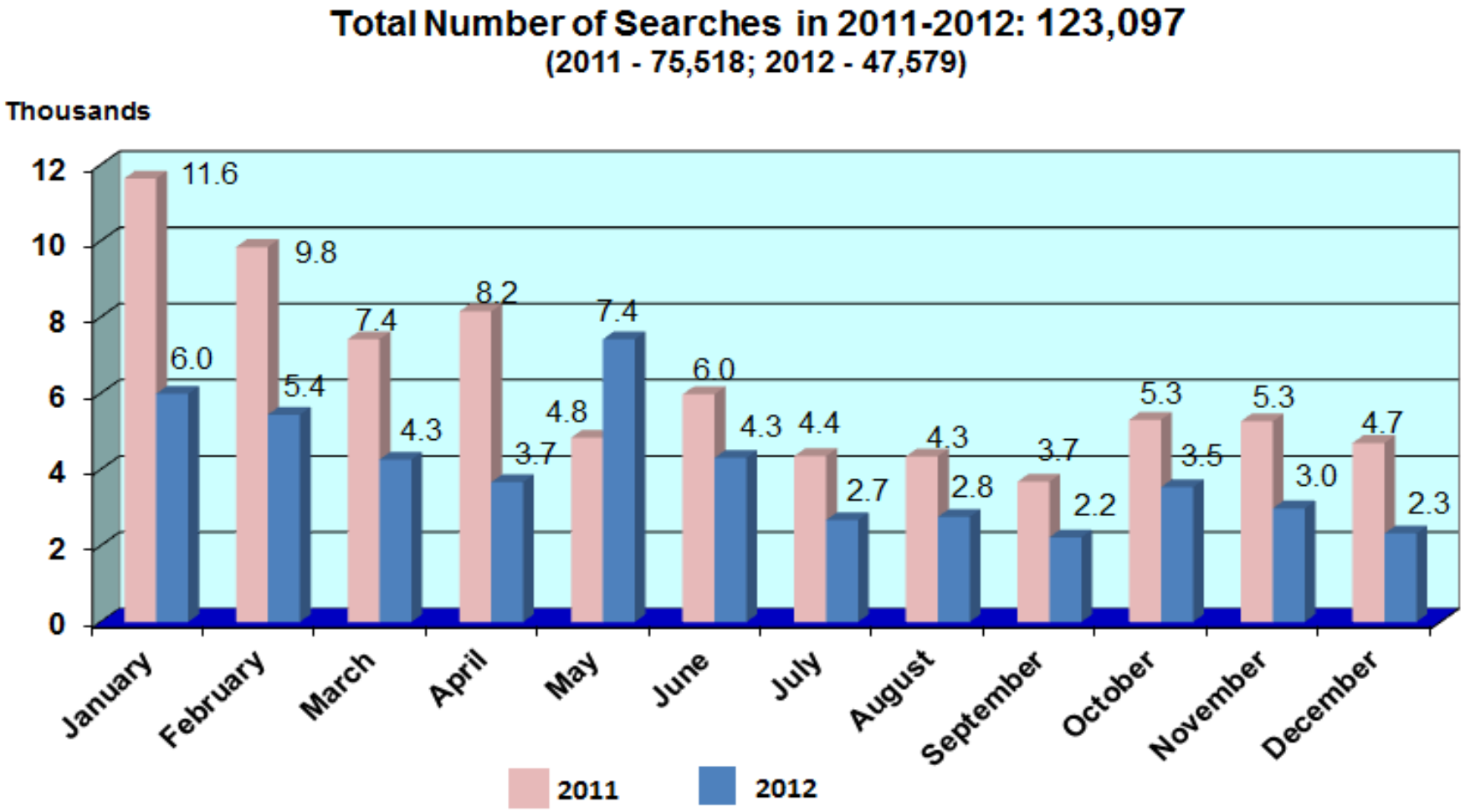
- Number of sessions
- Number of searches
- Number of full-text articles accessed (in pdf or html format)
- Number of abstracts accessed
- Number of rejected sessions (turnaways)

- These indicators were selected based on the recommendations of the internationally recognized standard: COUNTER-2008, Counting Online Usage of NeTworked Electronic Resources, http://www.projectcounter.org.
- Numbers of sessions and searches characterize overall intensity of the JAC use.
- Number of full-text articles characterizes the desired output of the solution and can be linked to the value provided by the service.

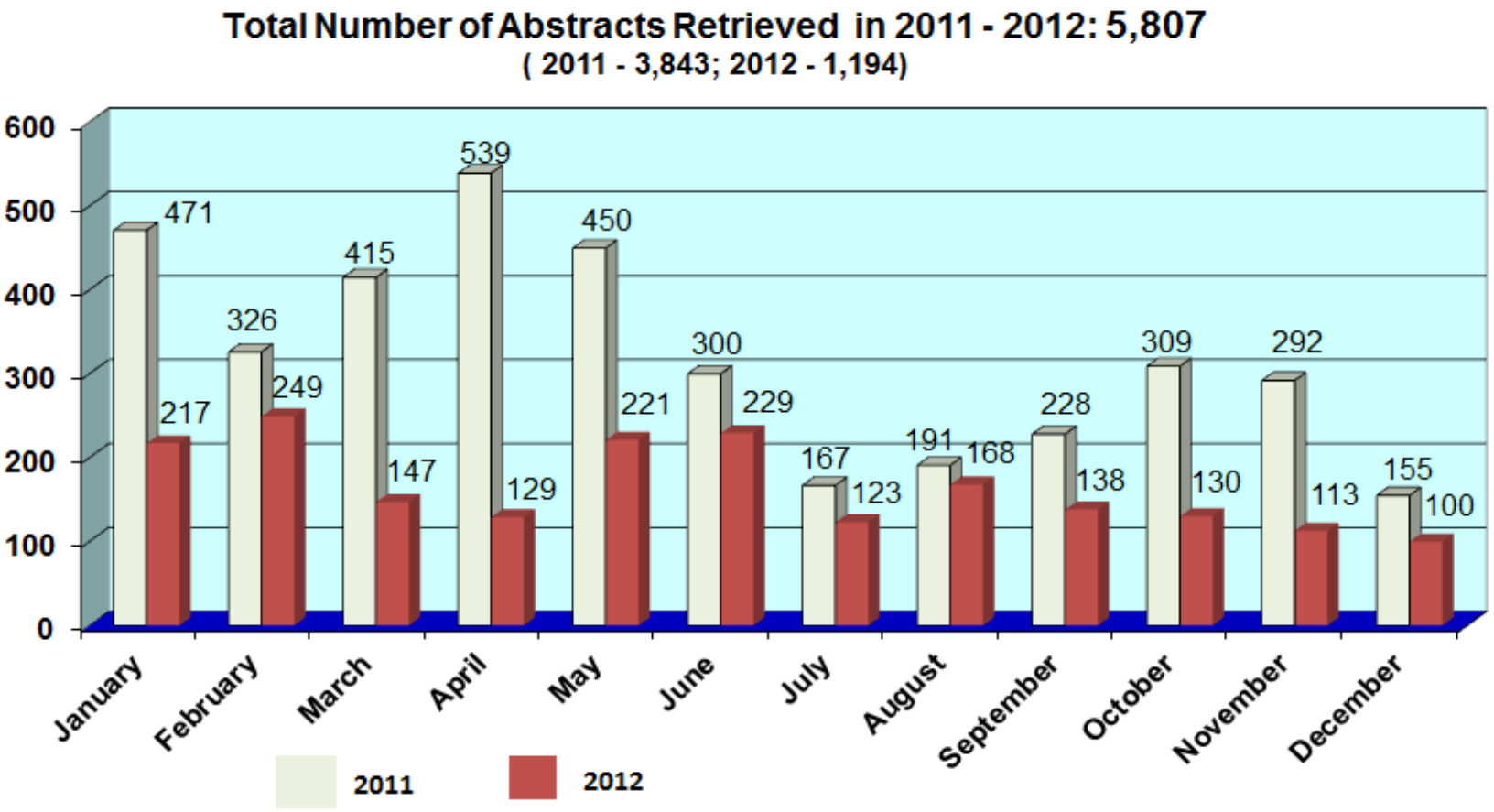
Usage Statistics - Number of Sessions



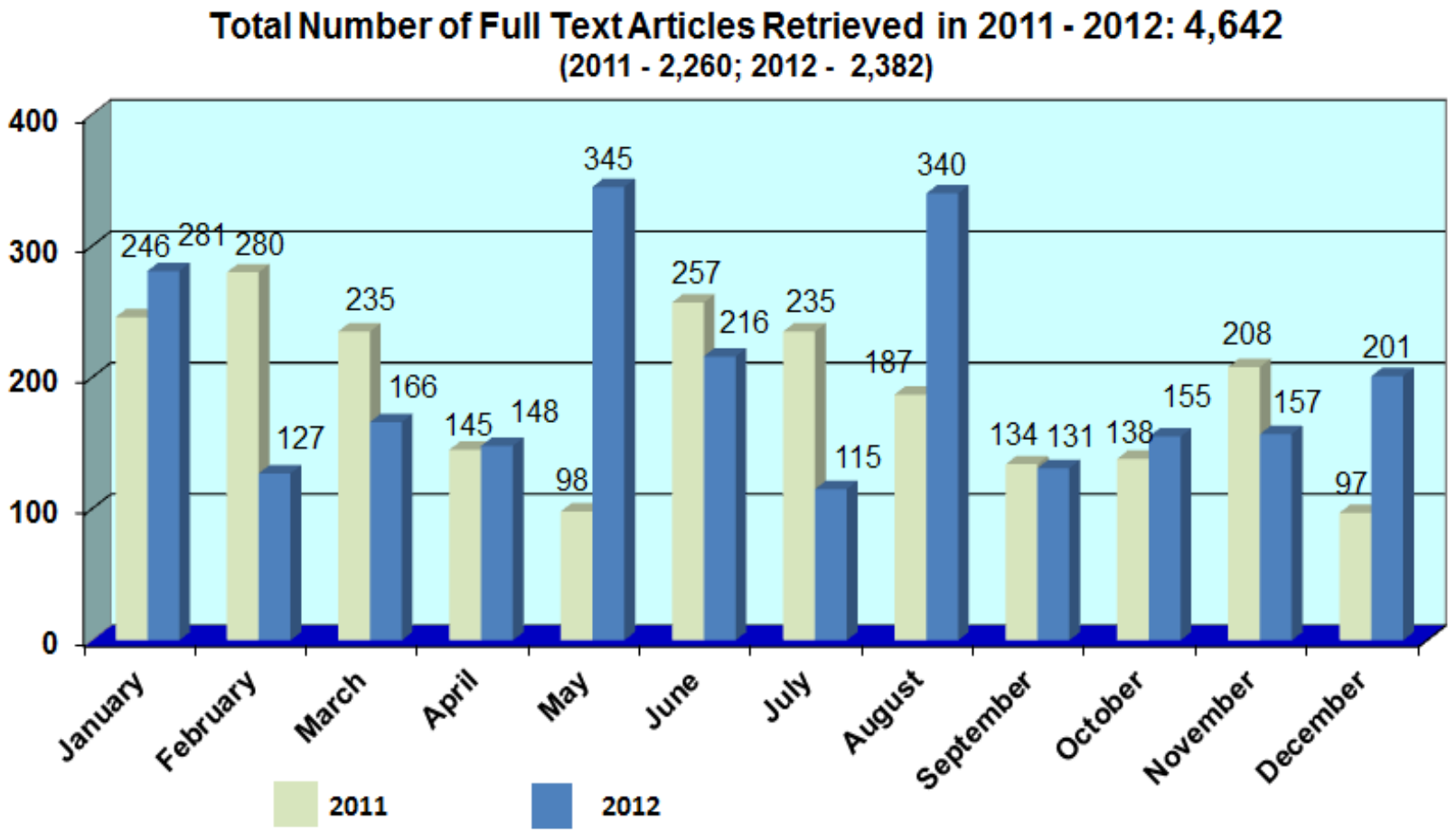
Usage Statistics - Number of Searches



Usage Statistics - Number of Abstracts Retrieved



Usage Statistics - Number of Retrieved Full Text Articles



Usage Statistics - Most Frequently Used Journals

ISSN/ISBN	Title	Full Text Articles	Abstracts
00178012	Harvard Business Review	840	177
00900036	American Journal Of Public Health	110	56
00084263	Canadian Journal Of Public Health	74	38
00028614	Journal Of The American Geriatrics Society	65	44
15334406	The New England Journal Of Medicine	60	36
08203946	CMAJ: Canadian Medical Association Journal	53	33
13558196	Journal Of Health Services Research & Policy	50	9
03092402	Journal Of Advanced Nursing	40	10
00197939	Industrial & Labor Relations Review	36	12
01607480	Modern Healthcare	36	12
14726963	BMC Health Services Research	35	26
07067437	Canadian Journal Of Psychiatry	34	8
15393704	Annals of Internal Medicine	31	22

The table presents the top part of the usage report by journal title for 2011 – 2012 calendar years. The report shows that users accessed 2,879 journal titles. Articles from 970 journals were accessed with full-text.

Usage statistics confirm that JAC databases generate large traffic (sessions, searches) and provide significant value (full-text articles) to the MOHLTC and LHINs staff.

Performance – Customer Feedback

- Concerns of the users:
  - Expand access to more peer-reviewed journals in healthcare, medicine, social sciences, business, economics and management.
  - Expand access to more full text articles.
  - Reduce journals embargoes (access to journals delayed by months or years).

- Continuously monitor customer satisfaction and make enhancements to the currently acquired content to ensure increased utilization of JAC services across the ministry

Assessing Financial Efficiency (1)

- Financial assessments provide rational for the decisions on databases renewals.
- Example - **Health Policy Reference Center** database.
  - The cost of the annual subscription is around $5,000 USD.
  - Annual demand for full-text articles from the database is 177.
  - Users accessed articles from 121 journal titles.
- Two alternatives of the service with the same output (access to the full-text journals and articles) have been explored. Comparative quantitative assessments have been made based on the actual usage statistics.
  - **Alternative 1.** Centralized “Article on Demand” purchasing.
  - **Alternative 2.** Centralized subscription to individual journals.

Assessing Financial Efficiency (2)

- **Alternative 1.** Centralized “Article on Demand” purchasing.
- Within this option, no journal subscriptions are acquired. Users conduct search with generic search engines (e.g. Google), find pertinent articles, and send requests through the Exchange Solution Desk (ESD). ESD buys individual articles online from the journal publishers.
- The cost of purchasing an article is $30 (average cost based on the experience of the JAC article on demand service). Purchasing cost will be $5,310.
- Another parameter should be factored in for this option. Ordering large number of articles (hundreds) would require additional human resources allocated to the ESD. With an average time needed to purchase an article of 0.5 hours, total additional work of 89 hours will be required. That equals to approximately 4.6% of FTE (or $2,800 in financial terms).
- Overall cost of the Alternative 1 is $8,110.
- Subscription for the Health Policy Reference Center database financially is 60% more efficient than Alternative 1. In addition, ordering large number of articles will result in time delays of delivering electronic copies to users. That, in turn, will decrease customer satisfaction.

Assessing Financial Efficiency (3)

- **Alternative 2.** Centralized subscription to individual journals.
- Instead of purchasing primarily databases from electronic journal aggregators (e.g. EBSCO), subscriptions of individual journals are purchased through the original journal publishers.
- Individual journal subscriptions are very costly. An average price of an annual journal subscription (one title) varies with the discipline/publisher:
  - All disciplines $1,264.31 (2011) http://www.mcafee.cc/Journal/Summary.pdf
  - Springer publishing (all disciplines, around 2,000 journals) $1,424.73 (Feb 2012) http://www.springer.com/librarians/price+lists?SGWID=0-40585-0-0-0
- A conservative (low) cost has been used in the calculations - $700 per title.
- JAC users accessed 121 journal titles. Only mostly used journals (ones that were accessed 5 (five) or more times) were included in the calculations – 26 total.
- The cost of Alternative 2 is $18,200.
- JAC subscription is 3 - 4 times more efficient than Alternative 2.

JAC's COST - EFFECTIVENESS

Needs / Criteria	Journal Access Centre	Alternatives		
		Centralized Subscription to Individual Journals	Centralized "Article on Demand" Purchase (No Subscription)	Decentralized Subscription to Individual Journals
Content What journals could be accessed? Need to have access to multiple journals (peer-reviewed serials) in health care, medicine, business, economics • Number of journals • Number of articles	• More than 8,000 journals including over 3,000 full-text • Over 4.8M articles (including prior years online archive) • Journals are selected to cover: health, medicine, social science, business, policy, management, risk management, etc • JAC users indicate that even more journals are needed	• Approximately 100 journals • Due to a high cost of individual subscriptions (average cost per title $1,000) only pivotal journals could be procured **~ 3% of JAC's capacity**	• No selected journal subscriptions are procured • Savings gained • Users are in "free hunting" mode on the web • No pre-selected content will result in a mix of evidence-based trusted sources and materials of questionable quality	• Managers (175 SMGs and 273 MCPs) will buy journal subscriptions independently • Approximately 100 journals • Due to a high cost of individual subscriptions (average cost per title $1,000) only pivotal journals could be procured • Independent content selection will lead to duplications and inefficient use of the resources **Less than 3% of JAC's capacity**
Search Is it easy to find what I need? Need the ability of conducting effective search • Search quality (relevant to "noise" documents ratio)	• EBSCO search engine • Integrated search allows for finding articles from EBSCO and several other database vendors (e.g. Cochrane) • Advanced search functions (e.g. extensive limiting features to narrow/focus search)	• EBSCO search engine can be used • Advanced search functions (e.g. extensive limiting features to narrow/focus search)	• General-purpose search engines, e.g. Google, Google Scholar • Important medical repositories (e.g. PubMed) are not covered completely • Some materials retrieved may not be scholarly • Lack of controlled vocabulary **~ 70% of JAC's capacity**	• General-purpose search engines, e.g. Google, Google Scholar • Content browsing
Full-Text Can I get to the source? Need to have access to full-text documents • Number of full-text documents • Time to access full-text document	• JAC users download around 2,500 full-text article annually (from 1090 journals) • Full-text articles are available immediately within the search window • Another 30-50 articles are ordered through the Exchange Solution Desk annually	• Mostly used 100 journals provided 55% of the total downloaded full-text articles **~ 55% of JAC's capacity**	• Ordering articles through the ESD will create 1 – 2 days delay between finding the article abstract and receiving its full text version • According to customer feedback, inability of immediately presenting a full-text article is a major deficiency of the journal database which will affect its uptake and user satisfaction • The workload of ordering articles (2,500 per year) will require additional 0.4 FTE	• Mostly used 100 journals provided 55% of the total downloaded full-text articles **Under 55% of JAC's capacity**
Cost What's the budget? Need to have a reasonable, predictable budget • Annual budget	**$100,000[1]** JAC FY2011-12	**$100,000[1]** $1M - $3M to reach JAC's capacity	**$100,000[1]** Comparable budget but requires additional 0.4 FTE to reach JAC's capacity	**$100,000[1]**
Overall Conclusions	**Strongest solution among the analyzed alternatives** **Requires fine-tuning and constant monitoring of the user needs**	**Significantly lower capacity compared to JAC**	**Requirement of additional 0.4 FTE makes this alternative not feasible**	**Inefficiency of decentralized subscriptions led to the development of JAC**

1 – Amount shown for illustrative purposes only.

JAC Content Selection Advisory Network

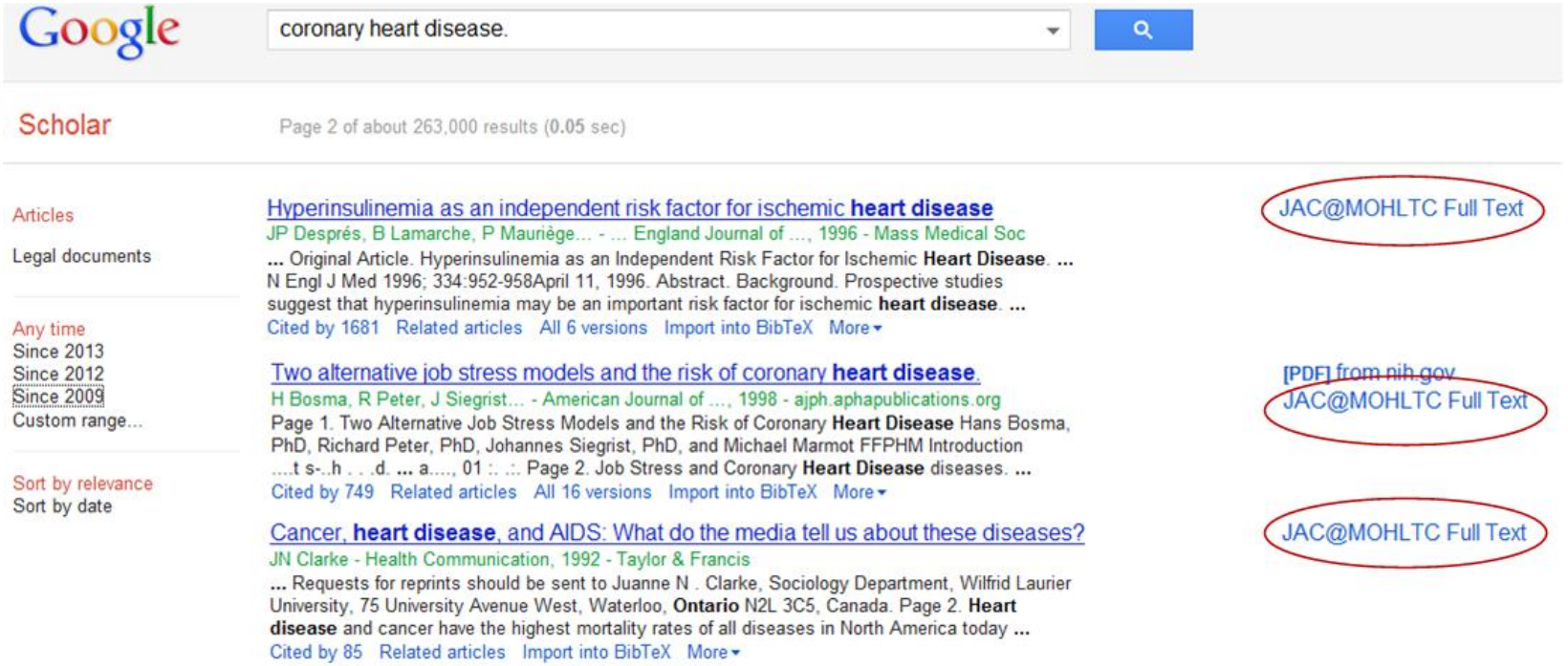
- JAC Content Selection Advisory Network, established in 2012 with representatives from all MOHLTC divisions (18 branches), is an important component of the JAC governance and communications across the ministry.
- **Purpose**

  The purpose of the JAC Content Selection Advisory Network is to provide input into acquisition of new content and to shape the direction of the Journal Access Centre to best meet evolving Ministry of Health and Long-Term Care (MOHLTC) and LHINs user needs. The goal is to provide an online resource to support evidence-based policy development and decision making.
- **Scope**

  The Journal Access Centre (JAC) Content Selection Advisory Network fulfills the role of a program committee rather than just an individual project. Under a program mandate the Content Selection Advisory Network will provide advice and guidance about provision of continuity of content across multiple discrete database selection projects over a multi-year time period. It is a consultative body for information and business development supporting a diverse user community.

Integration of Google Scholar and JAC/EBSCO:

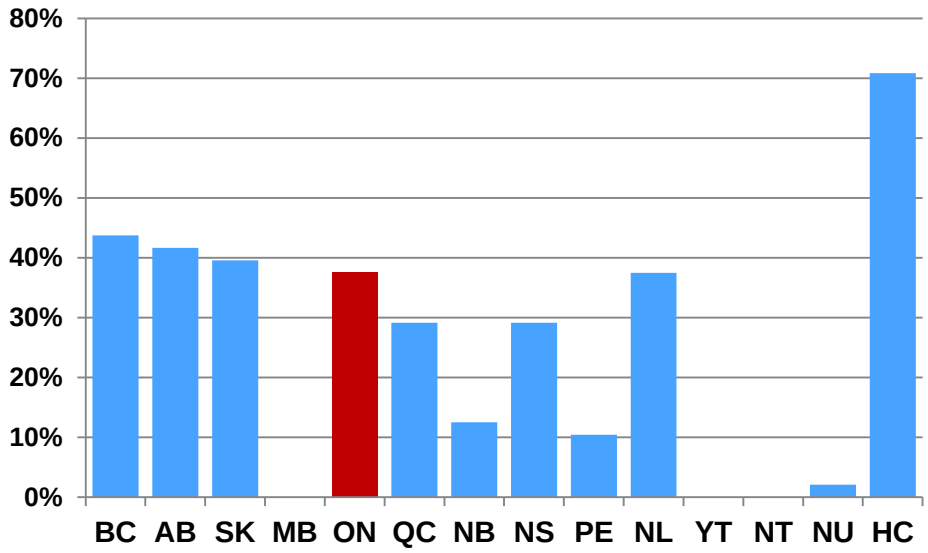
Pilot Project



- Now, when our users perform search in Google Scholar (http://scholar.google.ca), for the articles that are available with full text in the JAC repositories, they see a tag “JAC@MOHLTC Full Text”. Clicking on the tag, opens full text article.
- Very positive feedback from users.
- Some fixes required. For a variety of reasons, tags work inconsistently, e.g.:
  - Latest journal issues may be not in EBSCO DB yet or are embargoed.
  - Google Scholar bibliography data may be incorrect.

Environmental Scan – Canada-wide

- Access to online journals
- Ministries of Health (14): all provinces, all territories and Health Canada (federal)
- An ad-hoc set of 48 health-related scientific journals with high impact factors



Source of data: Léon et al.: (2013) [4]

Environmental Scan – OPS

- Ministries with subscriptions to the online journal databases:
  - Ministry of Health and Long-Term Care
  - Ministry of Finance
  - Ministry of Natural Resources

- Organizations exploring online journal databases:
  - Ministry of Children and Youth Services
  - Cancer Care Ontario

- Some organizations have online subscriptions to individual journals

Conclusions

- A contemporary landscape of journals, as a backbone of the research communication system, is complex, constantly changing and growing with hundreds of journals and thousands of articles published in each subject discipline monthly.
- Access to journals is a key prerequisite for evidence-informed decision making.
- Information needs of the Ministry are diverse and dynamically changing under the influence of varying health system demands and altering political priorities. Commonly, information needs must be fulfilled urgently. Users require immediate online access to full-text articles of interest (no abstract-only, no delays/embargoes).

Continued…

Conclusions (2)

- Information needs cannot be mapped to a reasonably compact group of “core” journals (with a subsequent subscription to those). Annually, Ministry users access articles from around 1,000 journal titles. List of these titles varies from year to year.
- A sustainable journal information management solution should include:
  - Access to multiple online journal databases procured from the journal aggregators (e.g. EBSCO).
  - Access to multiple online journals procured from individual publishers (high impact journals from subject disciplines not covered in journal databases).
  - Article on Demand service to procure articles from journals not found in the journal databases and separate journals.

Continued…

Conclusions (3)

- Journal information management solution should also include:
  - Integrated search functionality allowing retrieval of articles from all accessible repositories in a single run.
  - Reporting functionality allowing generation of detailed usage statistics.
- Enhancement of the journal information assets' value should incorporate continues content optimization based on the usage statistics and assessment of financial efficiency.
- Self-directed motivation of journal users should be supported and enhanced with the institutional impetus to stimulate use of the online journal databases and formalize related business processes of evidence-informed decision making.

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The views, opinions and conclusions expressed in this document are those of the author alone, and do not necessarily represent the views of the Ontario Ministry of Health and Long-Term Care or any of its individual departments.

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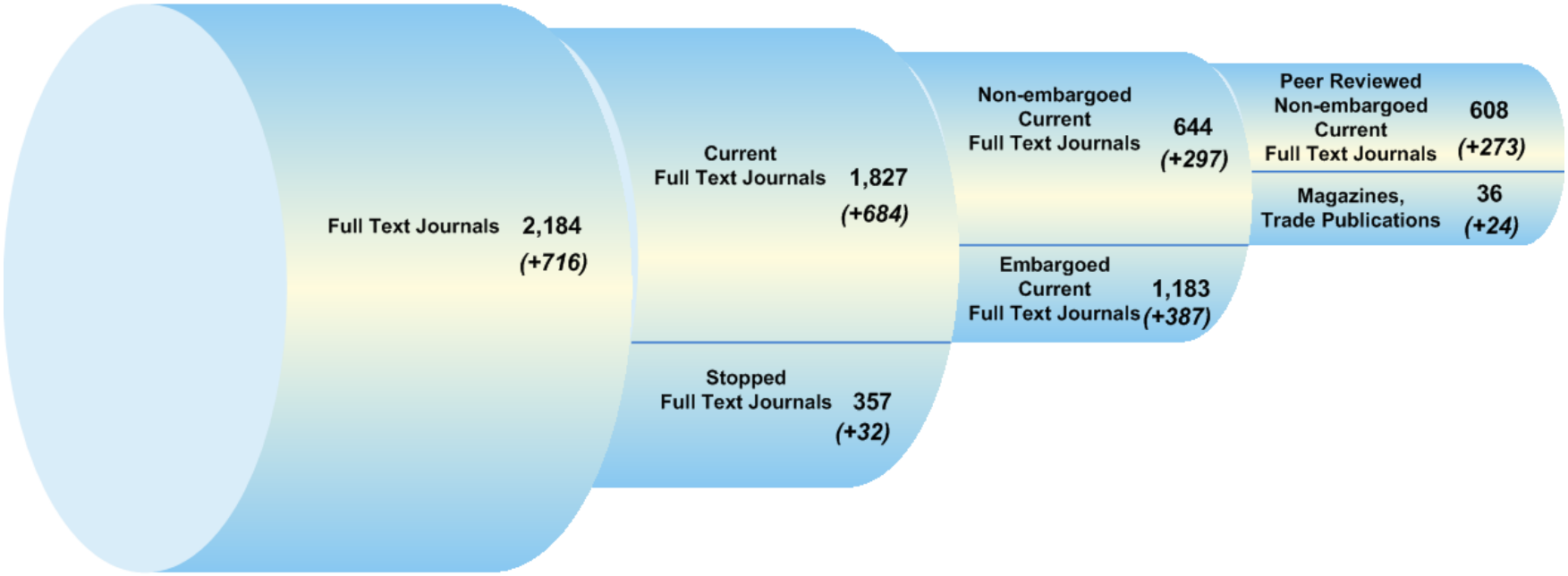
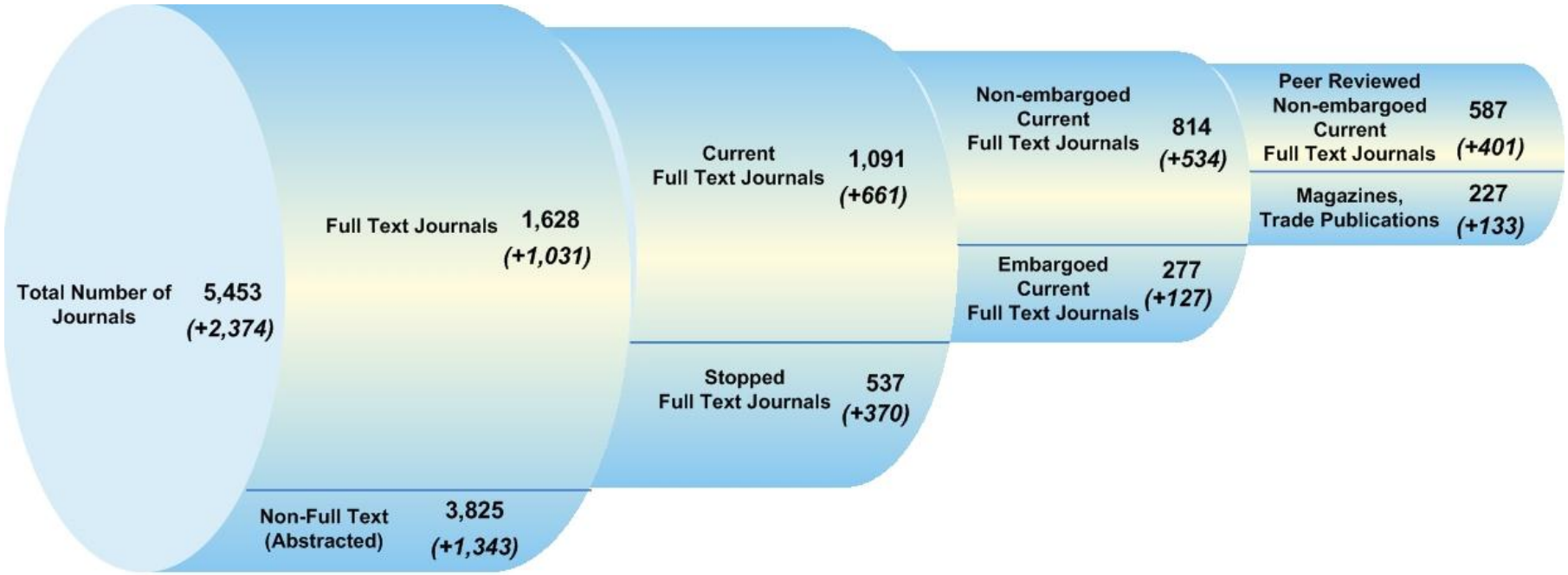
APPENDIX

MEDLINE Complete Database Content



Journal structure of the MEDLINE Complete database is presented on the chart. This database includes all the journals available in the MEDLINE with Full Text database plus over 700 additional full text journal titles from the same knowledge field. On the chart, the numbers in brackets indicate additional number of journals by category.

CINAHL Complete Database Content



Journal structure of the CINAHL Complete database is presented in the chart. This database includes all the journals available in the CINAHL with Full Text database plus over 1,000 additional full text journal titles from the same knowledge field. On the chart, the numbers in brackets indicate additional number of journals by category.